

# Introducing Environmental Literacy in the Tertiary Curriculum

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## A B S T R A C T

There are many examples of environmental courses in tertiary institutions, but the integration of environmental education across the range of courses has generally not occurred. The paper describes a process and strategy to establish environmental literacy in tertiary courses. This strategy was developed from a project to introduce waste minimisation education into four disciplinary based courses. Since waste minimisation was introduced in the context of ecological sustainability, the project provided a framework for the broad principles of environmental literacy. The project began with the assumption that adequate materials were already available, but what was needed was a process that would guide academics in the revision of their course content, and would support them in making changes. The paper reports on the conduct of the project and, based on our experiences, presents a strategy for developing curriculum change. This strategy has been developed to recognise the contexts associated with environmental understanding and tertiary institutions, and the processes needed to facilitate the change.

### Environmental literacy in tertiary courses: Need and inertia

Over two decades in Australia there has been a substantial growth in the number of tertiary environmental courses (Cosgrove and Thomas, 1996). Over that period various Conservation Strategies and the Ecologically Sustainable Development process have emphasised that environmental education should have a higher profile at tertiary institutions (Victorian Government 1987, Commonwealth of Australia 1994). Yet, in 1998 the President of the Australian Association for Environmental Education was moved to reiterate the need for the development of environmental literacy:

'Universities need to find the ingenuity to blend all the disciplines so that we will increasingly see schools of business and economics teaching environmental awareness and education. ... If we continue to produce lawyers, business people, teachers, doctors, politicians, and other graduates while failing to create in them a high degree of environmental literacy, a university is not fulfilling the obligations it has to society (Dingle 1998, pp. 3-4).

Environmental literacy currently is the focus of the specialised environmental courses, such as Environmental Science, Environmental Engineering, and Environmental Studies. However, these courses are often based in a single discipline, and are not focused on the development of environmental literacy in other courses. As a result it seems that, apart from the occasional subject which is often an elective, most tertiary students have few opportunities to participate in environmental education. Yet this is happening at a time when there is a growing interest in the need for environmental literacy of graduates.

Currently there is fertile ground for those of us concerned with environmental education. Many students already have a broad environmental awareness when they come to tertiary institutions (Ridener 1997), although this does not necessarily

give them the ability to assess environmental issues and take action on them. Also the general community has identified the need to take account of the impacts of our activities on the environment, as is apparent in the United Nation's Agenda 21 and Australia's National Strategy for Ecologically Sustainable Development. More particularly, the business community sees the need to take better care of the environment (for example Cairncross 1995, Callenbach *et al.* 1993, & Schmidheiny 1994). Professional associations increasingly see the need for their members to be environmentally literate: for example the Royal Australian Institute of Architecture (RAIA 1995), Australian Society for Certified and Practising Accountants (Barbera 1994), and Institution of Engineers (Australia) (IEA 1992). Hence there is a clear rationale, and need, for graduates to develop this literacy as part of their tertiary education.

Internationally there have been some moves in this direction. Of note is the work in Britain of Ali Kahn (1990, 1991 & 1994) and the 'Toyne' report (see Committee on Environmental Education in Further and Higher Education 1993). In essence these reports promote the establishment of a 'green curriculum' in tertiary institutions. In addition there has been a growing recognition amongst institutions of higher education of the need to incorporate environmental sustainability principles into the operation of their campuses (Keniry 1995, Strauss 1996). However, while there has been related activity in America and Britain (see for example Alabaster & Blair 1996) the Australian higher education sector has been slow to respond to such initiatives; to date environmental education remains at the fringe of tertiary curricula (Cosgrove & Thomas 1996, Dyer 1997).

The opportunity for us to investigate the issues involved in establishing the framework for environmental literacy (a green curriculum) was provided in 1997 when a project to integrate waste minimisation principles into tertiary curricula was undertaken at RMIT University. RMIT has been developing an environmental focus in its operations and teaching, through its work on waste minimisation (Connellan 1996), the

employment of an Environmental Co-ordinator and its work towards becoming a 'university for a sustainable future' (Greene 1994). In 1996 RMIT became a signatory to the Tailloires Declaration, one of the two signatories in Australia, making a strong statement that the university is committed to the integration and incorporation of principles of sustainability at all levels of campus life, operations, education, administration and student culture. More particularly, one of the goals of RMIT's Teaching and Learning Strategy is 'to equip students for employment, further learning and active citizenship through the promotion of soundly based, relevant and forward looking curricula' (RMIT 1998, p. 6). To support this, one of the Strategy's operational priorities is 'to integrate environmental literacy into all courses' (p. 6). This will be achieved through having faculties include contextually relevant environmental literacy objectives and implementation plans in their teaching and learning strategies.

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This activity provides the arguments for change and a general framework for the direction of change, but provides little insight into how change may be achieved when initiated by academics. It is apparent that there has been considerable support for environmental literacy, yet there is little evidence that it is happening. We need to ponder on why it has not happened, and particularly what is now needed.

Our own experience of tertiary teaching indicated that while some teaching staff express an interest in environmental matters, they may not be able to provide this focus in their courses and subjects. In addition to the many pressures faced by individual academics in an institution, and described by Cowell *et al.* (1998), observation suggests that staff may:

- . not know enough about the environment;
- . not know where/how to obtain relevant information;
- . not see how to combine information about the environment with the core knowledge of their subject;
- . not feel comfortable working across disciplines, as needed when disciplinary knowledge is taught in the context of environmental understanding;
- . be concerned that this environmental understanding would not be considered appropriate for their graduates, or their disciplines;
- . not be rewarded for such innovation;
- . feel unsupported;
- . see the possibilities for changing current courses

as being too difficult;

- . be concerned that what is appropriate for one course/discipline is not transferable to another; and
- . have increasing calls on their time for administrative, research and discipline related matters.

These comments are consistent with those made by Alabaster and Blair (1996, 98), who suggest that academic staff are '...often ideologically resistant to curriculum changes that emanate from outside the bounds of their discipline.' Structural constraints, such as the financial and administrative difficulties of developing cross-departmental (usually cross disciplinary) initiatives, can add to the resistance to change (Cowell *et al.* 1998).

Usually the approach to promote curriculum change has been to develop a resource pack or manual, but there are already many of these available, and availability of materials does not in itself lead to change. What has been missing, we suggest, has been a process to integrate environmental literacy; a process to guide and support staff, so that they can see the advantages of using environmental concepts, and can absorb them into their teaching as they choose. By process we mean a general structure that can assist academics initiate and implement curriculum change to embed environmental literacy in their teaching programs; particularly the processes for curriculum change that are supported by Dyer (1997). This process would build on any policy or position held by the tertiary institution to promote environmental awareness and literacy, but would not be totally dependent on the organisation having developed an 'environmental position'.

The following sections describe the environmental education issues that formed the basis of the project, the approach taken in the project and its results. The paper reports on the experiences that come from the project and particularly the implications for curricula development associated with environmental literacy in tertiary institutions. While the focus of the project was waste minimisation, from the outset we saw it as an example for the development of a broad environmental literacy.

### **Educating for sustainability**

The concept of environmental literacy, or in Orr's (1992) terms 'education for sustainability', contains several aspects. As well as there being the need to accept the probability of survival of our species, the key elements are:

- . an attitude of care or stewardship - particularly an '...uncompromising commitment to life and its preservation' (p. 133);
- . the knowledge necessary to comprehend inter-relatedness, of '...disciplines and of the disparate parts of personality: intellect, hands, heart' (p. 137); and
- . the practical competence required to act on the basis of knowledge and feeling.

Using somewhat different wording the same points have been expressed by many writers discussing the elements of environmental education (e.g. Greenall 1981). In particular Strauss (1996, p. 8) notes:

An environmentally literate person recognises that human actions have complex ecological and normative consequences. He or she has the motivation and education to investigate and pursue courses of action that contribute to a more sustainable future.

Hence there is considerable overlap between the concepts of environmental literacy and education for sustainability, with the words of Strauss (above) providing a working definition for environmental literacy.

Recent discussion relating to education 'for sustainability' indicates the need for values and environmentally ethical activity to be integrated (Sterling, 1996). This is consistent with the long-standing view held in Australia that environmental education is interpreted as education in, about and for the environment (for example see Greenall 1981, & Victorian Environmental Education Council 1992), so that values and an action focus are accepted features.

This active engagement exists outside traditional 'in' and 'about' course areas. Aij Khan (1994) claims such engagement can underpin curriculum in non-environmental courses and courses that deal explicitly with the natural environment; e.g. botany, biology. She goes on to characterise this involvement in the following way:

education 'in the environment	e.g. environmental or natural science courses (as a specialist or separate course)
education 'about' the environment	e.g. some teaching coverage of environmental issues and processes in specific disciplines, descriptive/reactive (often extraneous to the course)
education 'for' environment	e.g. environmental impacts, principles practice and responsibility across all disciplines some notion of engagement and action for the environment (as the core of the course)

Education 'for' the environment may be seen to be highly prescriptive (Ebutt 1992) so the associated value positions need to be appreciated when working with staff and students from a range of disciplinary areas. In reality the 'for' would vary according to the professional and pedagogical framework of a course. Nonetheless we have assumed that a graduate with environmental literacy would be capable, and confident enough, to act as an advocate for the environment in some, if not all, situations. We have also assumed that where an institution has a 'green curriculum' in place, its graduates would be environmentally literate.

An additional issue is the broad pedagogical models that would be used to develop literacy and a green curriculum. As

identified by Dyer (1996) and Woods (1994) the three main approaches are:

- the inclusion of the coverage of some environmental issues and material in an existing subject of the course;
- having a separate subject that deals specifically with environmental matters;
- integrating environmental issues and discussion into all subjects so that environmental understanding is developed in the context of the discipline, the course, and the subject material.

In courses where there has been an attempt to introduce environmental discussion the first two approaches appear to have been used, while the latter has usually been reserved for the specialist environmental courses. The advantage of the subject-based approaches is that they are relatively easy to introduce, provided staff feel comfortable about working outside the strict boundaries of their disciplines. The disadvantage is that students can interpret the environmental material, and its messages, to be 'in addition' to their core (disciplinary) studies, and therefore not as important.

The RMIT project worked with four diverse undergraduate course areas to throw light on these various issues, and to gain experience with curriculum change in different discipline areas; Accountancy, Architecture, Building and Construction Economics and Nursing. With the direct involvement of staff the project focused on how and where waste minimisation could be integrated into their course area. From the start, however, we assumed that waste minimisation represented an instance of the wide range of environmental issues that would be involved in a green curriculum.

### Key elements of the project

During the first semester of 1997 we met with a range of people associated with the RMIT courses, and with waste management, to develop examples of waste minimisation that would be used in the four courses. The program allowed for these examples to be taken into second semester classes, so that their evaluation could be completed by the end of the year.

Underlying the examples was the establishment of a set of principles to guide thinking about waste. In an educational setting 'waste' had a variety of different meanings which required different levels of understanding, and hence different ways of being introduced into a curriculum. These meanings went from the straight forward to the more complex - a hierarchy. The same would be expected with other aspects of environmental literacy. It became clear that more multi-dimensional understandings of waste minimisation required more sophisticated approaches for integration in the curriculum, and required greater changes to courses.

Also we were involved in the development of a categorisation of the learning outcomes that would be associated with the approaches. 'Learning outcomes' are the point at which



educational principles and other principles meet. By thinking about what the integration of an understanding of waste minimisation would add to students' learning, a set of learning outcomes were developed which reflected the possibility of different levels of sophistication and engagement with waste minimisation issues. These outcomes were designated lower, transitional and higher learning outcomes.

To reach this point we had decided to work through and with staff having an existing commitment to integrating environmental themes into their course areas. We felt that if we were to make any progress in implementing a green curriculum the project needed to facilitate change rather than

attempt to direct that change. This view was endorsed through initial discussions with staff whose first response was 'is this another directive from Building 1?!' (the location of RMIT's central management).

### Outcomes of the project

Firstly, involvement of the staff of the courses created new opportunities for communication for them, and thus created greater coherence between subject areas within their course. The project also facilitated communications between course areas, something that is essential for the development of multi-

#### Figure 1 - Summary of Strategies

##### 1. Recognise the Context

###### 1.1 The Institutional Setting

Strategy 1: Make use of existing commitments and policies relating to environmental management, waste minimisation and other environmental issues.

Strategy 2: To achieve successful integration, ensure that a person or committee with stability, tenure, continuity, or broadly some ongoing commitment to the institution, is dedicated to the integration of environmental literacy.

###### 1.2 Understanding the Educational Context

Strategy 3: Identify and make use of existing educational policy on a variety of levels to support the integration.

Strategy 4: Link the introduction of curriculum change (such as the integration of waste minimisation principles) to other curricula innovations and to new commitments in teaching and learning practice.

Strategy 5: Identify the way curriculum is developed and assessed in a department and its courses.

Strategy 6: Initiate any curriculum change or integration work by drawing on existing work, making links between the courses and wider university policies.

###### 1.3 Industry and Professional Context

Strategy 7: Identify the priorities and commitments of professional organisations and industry to support the integration of environmental awareness and action into the curriculum

##### 2. Establish the Process

###### 2.1 Presenting Environmental Issues (such as waste minimisation)

Strategy 1: Identify how and why the environmental issue is relevant to a course and student learning.

Strategy 2: Show the educational value of integrating the issue (e.g. waste minimisation principles) by linking them to student learning, to the learning outcomes of a course or a subject and to the application of those outcomes to the workplace.

Strategy 3: Prioritise learning outcomes associated with the environmental issue.

###### 2.2 Working With Staff

Strategy 4: Facilitate staff involvement in the integration of the environmental issue.

Strategy 5: Acknowledge the natural reluctance to change and highlight the personal benefits of involvement in the integration work.

Strategy 6: Identify and develop staff support mechanisms.

###### 2.3 Working With Students

Strategy 7: Seek student involvement.

###### 2.4 Facilitating Integration

Strategy 8: Facilitate the integration of the issue (e.g. waste minimisation principles) through recognising and respecting the different course cultures.

Strategy 9: Develop consistency in approaches to integrating the environmental issue where appropriate within courses, across subjects and in departmental practice through departmental committees and course advisory committees.

Strategy 10: Develop methods for the evaluation of the integration work.

Strategy 11: Publicise the integration work.

disciplinary models for the integration of environmental literacy, such as that for waste minimisation.

Some academic staff were initially concerned that inclusion of environmental literacy would mean more work, such as in re-writing subjects. The availability of project workers for support and resources greatly diminished this potential problem. By the end the task had been both interesting and achievable; as one academic commented:

it seemed (extra work) at first at the macro level but at the micro- level it is actually less work ... .. waste minimisation is now on the agenda with regard to how staff are doing things around the office (saving paper) but also in introducing students to scenarios in their field work which raises their awareness of waste minimisation and their skill levels in how to reduce and avoid waste...

The project also opened up opportunities once in the too hard basket, such as different disciplines working together. Some staff were able to review the subjects they taught and appreciated how much they and fellow staff were doing already and felt supported in this work. This opened up opportunities for greater co-ordination of effort and resourcing subject development.

However, the principal outcome was the development of a process for introducing environmental literacy into a tertiary curriculum. This is essentially a set of strategies drawn from the process and experience of working with the needs of academic staff, and the constraints they experienced. These strategies were not limited to a description of what might be involved, in an abstract way, in integrating new material into curricula. Rather they are based on the experiences, related to integrating waste minimisation, that have been modified to be equally relevant to other areas of environmental literacy. This set of strategies is summarised in Figure 1. The details of the strategies, and teaching resources are to be found in the project's report (Alvarez & Kyle 1998)

### Where to now with environmental literacy

What was both surprising and interesting about this project was the realisation that facilitation of effective curriculum change required a rich understanding of waste minimisation in specific and general settings, a thorough grasp of university and course structures, and an appreciation of individual staff, student and course needs and achievements. We expect that the same will be the case for any environmental issue that is chosen as the catalyst for the exploration of the principles, values and knowledge which form the basis of environmental literacy.

The set of strategies have been developed to provide guidance in the process of establishing environmental literacy, or a green curriculum, and to help others avoid much of the groundwork involved. Successful integration appears to be assisted when:

- there is a clear commitment to environmental literacy, whether for ethical or pragmatic reasons, within the institution;
- those involved have credibility in an academic role, i.e. they are academics who have a working knowledge of the institution (especially the institutional policies and interests);
- the department, or group responsible for the course, supports development of environmental literacy;
- those promoting and facilitating environmental literacy have access to support networks, of people and resources; and
- staff are sensitive to the everyday realities of teaching and learning in a large institution where time, energy and financial concerns are paramount.

Not surprisingly there also seem to be situations which can stand in the way of curriculum change, including:

- a conservative dean;
- departmental restructuring;
- insufficient political accrument in the staff facilitating the change;
- a lack of willingness to green the whole curriculum, but a staged approach may be acceptable;
- increasing reliance on sessional/casual staff.


The proposed strategies (Figure 1) draw on our experience with the matters that assisted the RMIT project, and they make allowances for some of the 'hurdles'. One essential element of a strategy to develop environmental literacy is the use of the institutional, educational and professional contexts to lay a base of support for the introduction of curriculum change. These contexts are highly specific to individual courses. For example, development of environmental literacy in a Building course may embody the linking of 'best practice' for waste reduction on building sites, and keeping costs low, together with ideas for alternative building materials which reduce energy use and facilitate better communication with other professionals, particularly Architects. Similarly the growing number of professional bodies with environmental policies can be represented on relevant course advisory committees, to lend support to the development of environmental literacy in particular courses.

The second essential element is to establish a process to develop environmental literacy. It is insufficient to tell someone to change their subject, or to produce a pack of resource materials. Both teaching staff and students need to be involved in the process of curriculum change if it is to be understood and accepted. Staff need to understand the purpose of the change and the opportunities it can create, plus feel that they have the ability and resources needed. Likewise students need to see how the changes relate to their course, their lives, and their future employment.

The value of the project has been the understanding generated about the processes involved in curriculum change for the integration of environmental literacy into tertiary institutions. This understanding provides direction for other tertiary staff to change their curricula. Our results offer a framework, upon which the needs of individual courses can be built. In particular, the framework and process offer a means of acknowledging and building on current resources, and minimising the costs associated with establishing environmental literacy. Equally, since teaching staff are under pressure and may not be rewarded for moves to green their curricula, our results can reduce the perceived, or real, burden of their development work, since the broad introductory work has been done.

For years, in various ways, the environmental community has been talking about environmental literacy for graduates. Educational materials have been produced, but little has been done to enact curriculum change. What has been lacking is a workable approach for the integration of environmental principles and materials. The results of our project at RMIT serve to fill this gap, and so lead to the inclusion of environmental literacy in tertiary courses. The next step at RMIT is to implement our Teaching and Learning Strategy - to move to a green curriculum as faculties incorporate environmental literacy in their courses. At other institutions staff have the challenge of instigating a move for environmental literacy and seeing it through. How we all go about this, and our adaptations of the process and strategy presented in this paper, will need to be monitored for the insight it will provide for the future of environmental education in tertiary institutions.

As a post-script to the above, over the two years since the completion of the project environmental literacy has seen little tangible advancement at RMIT. People involved in the four courses of the project have continued their individual efforts within their course areas. However, there has been negligible interest in using the strategies we developed to implement the operational priority of RMIT's Teaching and Learning Strategy related to environmental literacy. We can speculate on the reasons for the lack of progress, but an absence of resources, of an advocate with status, and of shared core values amongst staff have been apparent. These issues would be fruitful areas for future research.

Also, our work with the project focused on the development of the strategies for curriculum change. To our knowledge the strategies have not been applied in any educational institution, so there is currently no indication of their effectiveness nor of how the approaches they embody relate to the literature associated with change in organisations and staff development. Again this is an area related to our future research interests. 

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